ACCESSION #: 9906220016

NON-PUBLIC?: N

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Fermi 2 PAGE: 1 OF 3

DOCKET NUMBER: 05000341

TITLE: Reactor Recirculation Pump Trip Results in Manual Reactor

Scram

EVENT DATE: 05/18/99 LER #: 99-002-00 REPORT DATE: 06/17/99

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 097

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:

50.73(a)(2)(i)(A)

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Joseph M. Pendergast, TELEPHONE: (734) 586-1682

Principal Engineer Compliance

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On May 18, 1999, plant personnel were performing routine field brush maintenance for the Reactor Recirculation Pump (RRP) "A" Motor Generator (MG) Set. The RRP tripped when personnel were changing the MG set exciter brush. The brush had shorted on the

opposite polarity bus bar. Core flow decreased which placed the plant in the "Scram Region" of the Power to Flow Map. Operators inserted a manual Scram at 1709 hours.

Plant systems responded as designed. All Control Rods fully inserted. Reactor Water Level 3 Primary Containment Isolation Valves [ISV] for Groups 4 (Shutdown Cooling/Head Spray), 13 (Drywell Sumps), and 15 (Traversing In-Core Probe) isolated as designed. Reactor water level was restored to its normal band, and Emergency Core Cooling Systems did not actuate.

The brush change out was completed while the plant was shutdown. Previous actions taken to minimize risk for a RRP trip during MG set brush replacement were not effective. An action was included in the corrective action program to evaluate options for improving the ability for successful changing of MG set brushes online.

INITIAL PLANT CONDITIONS:

Operational Condition: 1 (Power Operation)

Reactor Power: 97 percent

Reactor Pressure: 1024 psig

Reactor Temperature: 540 degrees Fahrenheit

DESCRIPTION OF THE EVENT:

On May 18, 1999, non-licensed plant maintenance personnel were performing routine field brush maintenance for the "A" Reactor Recirculation Pump [AD] (RRP) Motor Generator Set [MG]. At 1708 hours, the "A" RRP tripped during the MG set exciter brush change out. The brush shorted on the opposite polarity bus bar.

Core flow decreased and the plant entered the Technical Specification (TS) Figure 3.4.10-1, Power to Flow Map, "Scram Region". At 1709 hours, by procedure and TS 3.4.10.a., a licensed reactor operator placed the Mode Switch in Shutdown, inserting a manual Reactor Scram.

Plant systems responded as designed. All Control Rods [JD] fully inserted. Post Scram Feedwater [SJ] logic actuated. Reactor Water Level 3 Primary Containment Isolation Valves [ISV] for Groups 4 (Shutdown Cooling/Head Spray), 13 (Drywell Sumps), and 15 (Traversing In-Core Probe) isolated as designed. Reactor water level was restored to its normal band and Emergency Core Cooling Systems [B] (ECCS) did not actuate. At 1729 hours, the plant was stabilized, and the Scram was reset.

An Immediate Event Notification was made at 1758 hours in accordance with 10CFR50.72(b)(1)(i)(A) and 10CFR50.72(b)(2)(ii).

The brush change out was completed along with other planned maintenance activities while the plant was shutdown. On May 21, 1999, the plant re-entered Operational Condition 1.

This event is being reported under 10CFR50.73(a)(2)(i)(A) as a plant shutdown required by the Technical Specifications and 10CFR50.73(a)(2)(iv) as an Engineered Safety Feature Actuation.

CAUSE OF THE EVENT

The cause of this event is that previous actions taken to minimize risk for RRP trip were not effective. This conclusion is drawn from review of the initiating event, recent design modifications, and plant operating experience since the plant began replacing brushes online in 1987.

The initiating event was shorting of the brush to the opposite polarity bus bar during online brush replacement. The MG set was not fully designed for accessibility to allow online brush replacement, which involves some risk

of a RRP trip.

A design modification, completed in the sixth refuel outage, provided enhancements for the replacement of brushes online. Changes included enlarging the housing opening around the brushes, adding a hand guard around rotating connectors, and adding a varnish insulation covering to prevent accidental short circuiting between the bus bars. The short that caused the trip of the MG set occurred on the portion of the

bus bar. Subsequent laboratory tests found that the coverage of the varnish was not adequate to provide the dielectric needed to prevent a short between the bus bars.

This modification was one of several changes that have been implemented to extend brush life and to improve the ability to change brushes online. While several enhancements have been made (platform for access, quick disconnect on brush, new brush box, brush type, hand guard, varnish insulation) to improve replacement of brushes online, they have alleviated but not eliminated the risk for a pump trip.

ANALYSIS OF THE EVENT

The RRP trip is an event with moderate frequency as stated in the UFSAR Section 15.3. The expected equipment response and required operator actions are clear.

The Power to Flow Map, Scram region, represents an area where Boiling Water Reactors are susceptible to thermal hydraulic instabilities. Core flow

decreased as a result of the RRP trip. The Scram Region is greater than 96 percent Rod Line, and less than 40 percent core flow. Post RRP trip conditions of 103 percent Rod Line, and 39 to 40 percent flow placed the plant in the Scram Region. The manual Scram was inserted by placing mode switch in Shutdown.

All control rods fully inserted within their required Scram time. Reactor water level decreased from 196 to 131 inches above the Top of Active Fuel (TAF). Reactor Water Level 3 isolation valves closed as designed at 173 inches above TAF. Post Scram Feedwater logic actuated and the Reactor Feed Pumps (RFP) speed went to minimum run, as designed. Reactor water level was restored to and maintained in its normal band with the North RFP through the Start-up Level Control Valve.

There was no initiation of the ECCS. The Emergency Diesel Generators [DG] were available. The Average Power Range Monitoring [IG] chart and Transient and Recording System [IQ] traces were reviewed. No evidence of a thermal hydraulic instability was observed.

Control Room Operator actions were conservative and timely. Post Scram recovery actions were appropriately conducted.

CORRECTIVE ACTION

The preventative maintenance activity to change the RRP MG set brushes has been revised to inspect the brushes and only change them with the approval of maintenance management. The instructions for changing the brushes are being revised to remove the connector end of the brush first to reduce the

chance of shorting. An action was included in the corrective action program to evaluate options for improving the ability of successfully changing MG set brushes online.

PREVIOUS SIMILAR EVENT

LER 87-024, "Plant Shutdown Due to Inoperability of a Reactor Recirculation System Loop", described an event where the plant was Shutdown because of excessive wear on the MG set brushes.

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Fermi 2

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Detroit Edison

10CFR50.73

June 17, 1999

NRC-99-0061

U S Nuclear Regulatory Commission

Attention: Document Control Desk

Washington DC 20555

Reference: Fermi 2

NRC Docket No. 50-341

NRC License No. NPF-43

Subject: Licensee Event Report (LER) No. 99-002

Pursuant to 10CFR50.73(a)(2)(i)(,A) and 10CFR50.73(a)(2)(iv), Detroit Edison is submitting the enclosed LER No, 99-002. The LER documents the May 18, 1999 initiation of a manual Reactor Scram

No new commitment are being made in this LER.

Please contact Norman K. Peterson, Director, Nuclear Licensing, at (734) 586-4258 if you have any questions.

Sincerely,

cc: J. E. Dyer

A. J. Kugler

A. Vegel

M. V. Yudasz, Jr.

NRC Residents Office

Region III

Wayne County Emergency Management Division

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